

digital

DECWRITER IV

LA34

USERS GUIDE

digital

TECHNICAL DOCUMENTATION

CHANGE NOTICE

LA34 Users Guide

EK-0LA34-UG-001

ADDENDUM

The LA34 Users Guide (EK-0LA34-UG-001) may be used for both the LA34 and the LA38 Printer Terminals until it is superseded by a new issue. The following information will be incorporated into the new document.

EIA Cables

Because the LA34/38 uses fewer than the usual 25 conductors, special cables that are lower in cost than general purpose EIA cables are available: the BC22A, BC22B, and the BC03M.

BC22A-10 or -25 is available in 10 or 25 foot lengths for hookup between LA34/38 and computer. Each end of the cable is terminated with a female molded connector. The cable is shielded, contains 6 conductors, and is wired in a null modem configuration.

NOTE: For longer lengths, use the BC03M (specify length) instead of the BC22A.

BC22B-10 or -25 is available in 10 or 25 foot lengths for hookup between LA34/38 and computer. This cable may also be used for cable extension. One end of the cable is terminated with a male molded connector; the other end of the cable is terminated with a female molded connector. The cable is shielded and contains 14 conductors. Refer to Chapter 2, Installation, Interface and Specifications for pin connection details.

Paper Out (Switches 7 and 8)

The LA38 can detect a paper out condition. The LA34 can also detect this condition when equipped with a paper out option (LAX34-PL). In either case, the POWER/FAULT light flashes when paper runs out and the LA34/38 generates a preselected signal. The operator can choose one-of-four signal responses. The following table lists the four responses and the switch settings to select each response.

Table 1 Paper Out Signal Selection

Response To Paper Fault Condition	Internal Communications Switches	Switch Setting
Data Terminal Ready is dropped when carrier detect signal is deasserted. If carrier detect is not deasserted, the LA34 will continue to print and data may be lost.	Switch 7 (Paper Out/Paper Low)	Off (Open)
Transmits an XOFF.	Switch 3 (Auto X-ON/X-OFF) and Switch 7 (Paper Out/Paper Low)	On (Closed) On (Closed)
Data Terminal Ready is dropped.	Switch 7 (Paper Out/Paper Low) and Switch 8 (Paper Out A/Paper Out B)	On (Closed) Off (Open)
Transmits a 233 ms short break.	Switch 7 (Paper Out/Paper Low) and Switch 8 (Paper Out A/Paper Out B)	On (Closed) On (Closed)

Manual Override Lever

The manual override (switch release) lever may be used to disable operation of the paper out detection circuit when desired (i.e., when using friction paper feed). This lever is located at the left-hand side of the printer mechanism (Figure 1) and can be reached when the access cover is opened.

To override paper out detection:

1. Place power ON/OFF switch in OFF position. Open access cover.
2. With index finger, push lever (black) toward side of printer and pull forward until it snaps into override (off) position.
3. Close access cover. Place power ON/OFF switch in ON position and return terminal to normal operation.

To enable paper out detection:

1. Place power ON/OFF switch in OFF position. Open access cover.
2. With index finger, push lever (black) toward side of printer and push toward rear until it snaps into operate (on) position.
3. Close access cover. Place power ON/OFF switch in ON position and return terminal to normal operation.

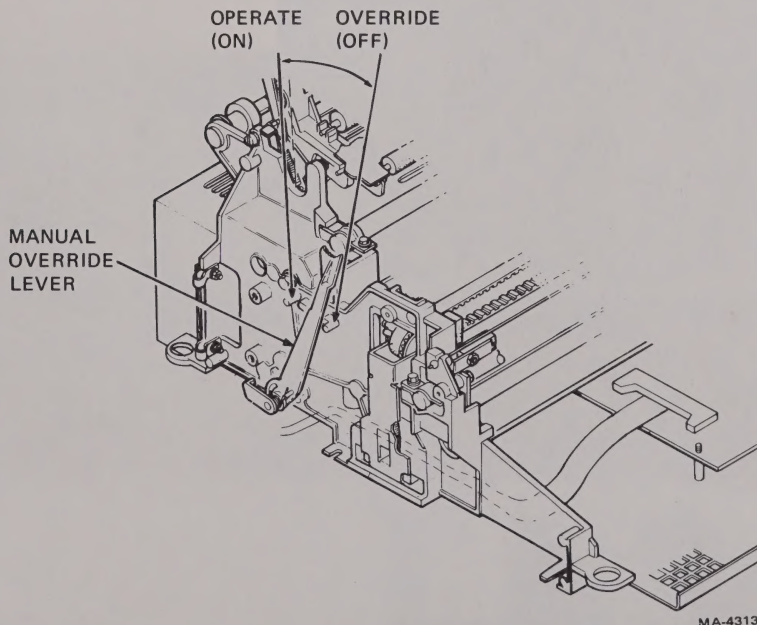


Figure 1 Printer Mechanism, Partial View

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OTHER TERMINALS

I'd like to know more about the products checked below.

- ☐ LA120 DECwriter III
- ☐ VT100
- ☐ PDT Intelligent Terminal Family
- ☐ Please keep me on your mailing list for new products.

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INTRODUCTION

CHAPTER 1 OPERATOR INFORMATION

General.....	5
PART 1 – CONTROLS AND INDICATORS.....	7
General.....	7
Keyboard Controls.....	7
Terminal Controls.....	11
Terminal Indicators.....	13
Audible Indicators.....	14
Internal Communication Switches.....	14
Feature Description.....	15
PART 2 – SETUP MODE.....	17
SETUP Mode.....	17
SETUP Features.....	17
PART 3 – RIBBON CARTRIDGE, FORMS, AND IMPRESSION ADJ.....	28
Installing a Ribbon Cartridge.....	28
Loading Paper and Pre-printed Forms.....	28
Print Impression Adjustment.....	30
PART 4 – TEST AND TROUBLESHOOTING THE LA34.....	31

CHAPTER 2 INSTALLATION, INTERFACE AND SPECIFICATIONS

General Installation Information.....	35
Unpacking and Installation.....	35
Packing Procedures.....	37
115/230 Voltage Selector Switch.....	37
Checkout Procedures.....	38
Interface Information.....	38
EIA Interface.....	38
LA34 Specifications.....	40

CHAPTER 3 PROGRAMMING INFORMATION

General.....	45
Printable Characters.....	45
Numeric Keypad.....	45
Break Key.....	45
CTRL (Control) Key.....	47
Control Characters.....	47
Escape Sequence Commands.....	48
Synchronization.....	53
Fill Time Formulas.....	53

CHAPTER 4 OPTIONS

Roll Paper Holder Options.....	57
Numeric Keypad Option.....	57
Tractor Option.....	58
Printer Stand Option.....	58
Accessories and Supplies.....	58

OTHER TERMINALS.....	59
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INTRODUCTION

The basic LA34 is a low cost, dot matrix, desk top printer terminal. It is microprocessor driven and capable of processing data at a rate of up to 45 characters per second. The operator's console provides printer controls and a typewriter-styled keyboard. The data communication is capable of operating at 300 baud on Bell 103J type modems and acoustic couplers.

The *LA34 User's Guide* is divided into four main sections.

Chapter 1 provides the operator with an introduction to the terminal, its features, and the general procedures required to operate the terminal.

Chapter 2 describes all the information necessary to install, cable, and check out

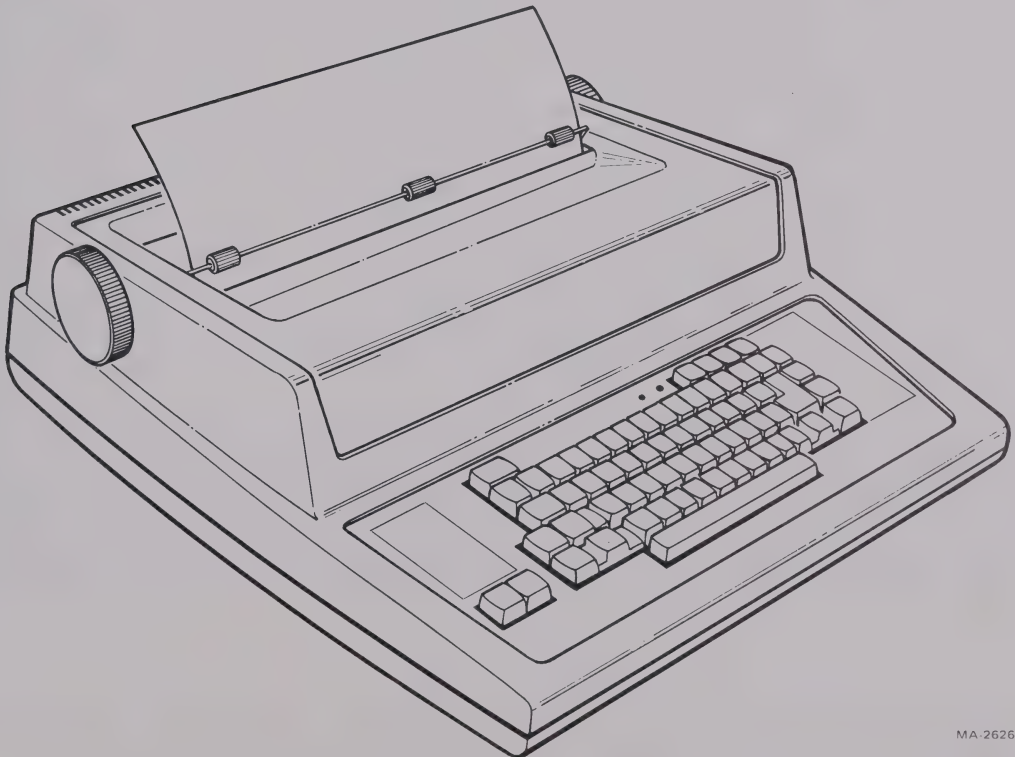
the LA34. The LA34 specifications are also included in this section.

Chapter 3 contains the information necessary to program the LA34.

Chapter 4 provides option information including installation and operation procedures for each option.

There are a number of accessories and supplies that may be added to your terminal to enhance the operation of your terminal. See the Accessories and Supplies section of this guide for a list of accessories and supplies and how to order them.

A detachable reference card is also provided to serve as a guide when you perform SETUP or escape functions.



CHAPTER 1

OPERATOR INFORMATION

• GENERAL

The LA34 DECwriter IV terminal is very easy to use, even if you have never operated a printer terminal before. It is designed to work very much like a typewriter. The operator's chapter will allow you to become familiar with the many LA34 features in a short period of time. The operator's chapter is organized into four parts.

1. Controls and Indicators
2. SETUP Mode
3. Ribbon Cartridge and Paper/Forms Information
4. Operator Testing and Troubleshooting

Part 1 of this chapter shows all the controls and indicators and summarizes the function of each.

Part 2 includes a description of SETUP Mode, a detailed description of the SETUP features, the procedure used to change each SETUP feature, and a SETUP feature summary.

Part 3 of the operator's chapter describes how to change the ribbon cartridge and how to load paper or preprinted forms.

Part 4 provides an easy to follow checklist for the operator in the event of a problem. Operator testing and troubleshooting is included in this section.

Part 1 CONTROLS AND INDICATORS

GENERAL

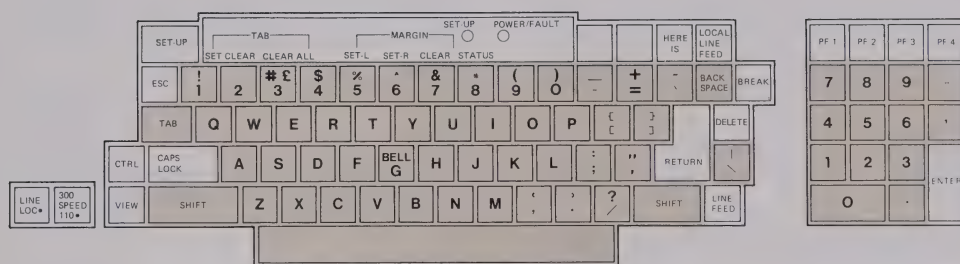
The LA34 is equipped with a wide variety of controls and indicators which are used by the operator to monitor and control terminal operation. This section of the operator's chapter is provided as a quick reference section of each control and indicator. It is grouped as follows.

- Keyboard Controls
- Terminal Controls
- Terminal Indicators
- Audible Indicators
- Internal Communication Switches

KEYBOARD CONTROLS

The LA34 uses a keyboard with a key arrangement similar to a standard office typewriter. In addition, an optional numeric keypad allows numbers to be entered in calculator fashion. The numeric keypad normally generates the same codes as the numeric keys on the main keyboard. The LA34 keyboard keys have been categorized as follows.

- Standard Keys
- Special Function Keys
- SETUP Mode Keys



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Figure 1-1 Standard Keys

Standard Keys

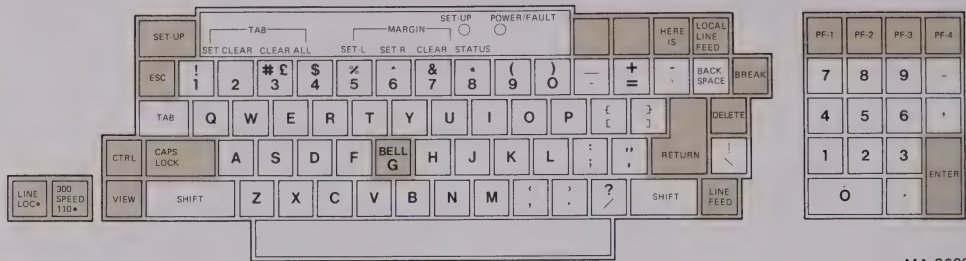
Figure 1-1 shows those keys of the LA34 keyboard that normally function as standard typewriter and calculator keys. The operator uses these keys to transmit ASCII codes. These codes are transmitted as each key is pressed except during an auto repeat activity or when certain combinations of two or more character keys are pressed, such as control codes.

NOTE

The actual operation of all keys is dependent on system software. Consult the local operating procedures for specific operation of these keys.

Auto Repeat

If any key outlined in Figure 1-1 (including the LOCAL LINE FEED and DELETE keys) is pressed for more than 0.6 second, the code for that key will be transmitted repeatedly at the rate of approximately 15 characters per second. The auto repeat feature does not affect the TAB key or the special function keys. If an auto repeat activity is in progress and another key is pressed, the auto repeat activity will begin on the new key. If more than one key is held down prior to the start of an auto repeat activity, only the last key pressed will be autorepeated.



MA-2608

Figure 1-2 Special Function Keys

Special Function Keys

Figure 1-2 shows the special function keys on the LA34 keyboard. The following paragraphs briefly describe each special function key. These keys may have a special meaning to the computer system software. Consult the local operating procedures for specific operation of these keys.

LINE LOC •

LINE (up position) – In this position the LA34 is connected to the communication lines for transmitting and receiving data.

LOC (down position) – Placing the switch in this position disconnects the LA34 from the communication lines. Only local operations can be performed.

300 SPEED 110 •

300 (up position) – In this position the LA34 transmits and receives data at the rate of 30 characters per second (300 baud).

110 (down position) – In this position the LA34 transmits and receives data at the rate of 10 characters per second (110 baud).

VIEW

This key allows the operator to see the last character printed by causing the print head to move 10.16 cm (0.4 in) to the right of the last character printed.

NOTE

Using the VIEW key has no effect on the printing rate or throughput of the LA34.

CTRL

When used in combination with another key, this key causes the generation of a control code.

CAPS LOCK

This key causes the alphabetic keys to transmit shifted codes regardless of the position of the SHIFT key. The CAPS LOCK key does not affect the numeric, symbolic, or special function keys.

ESC

This key causes the generation of the escape code.

SETUP

This key is used to enter and exit SETUP mode. (For more detail, refer to Part 2 of this chapter.)

**BELL
G**

When used in combination with the CTRL key, this key causes the generation of a bell code.

**HERE
IS**

This key is provided for future expansion.

**LOCAL
LINE
FEED**

This key advances the paper one line without transmitting a line feed code to the host computer.

BREAK

This key causes the transmission of a timed break signal. (See Chapter 3.)

DELETE

This key causes the generation of a delete code.

RETURN

This key causes the generation of either a carriage return or both a carriage return and line feed codes (in auto line feed mode).

**LINE
FEED**

This key causes the generation of a line feed code.

ENTER

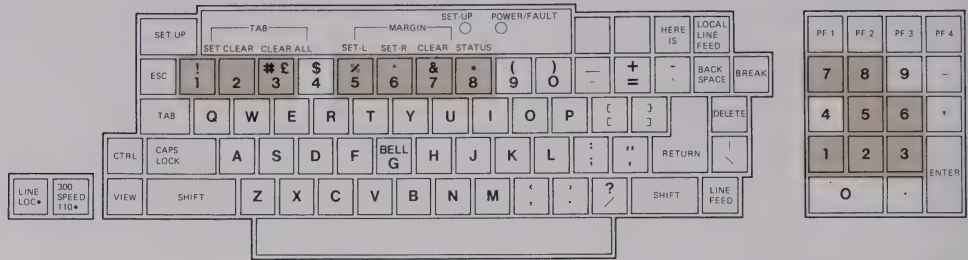
This key normally corresponds to the RETURN key on the main keyboard.

PF1-4 KEYS

These keys cause the generation of multiple codes which may have special meaning to the system software. (See Chapter 3 for more detail.)

BLANK KEYS

These keys are provided for future expansion.



MA-2609

Figure 1-3 Setup Mode Keys

SETUP Mode Keys

Figure 1-3 shows the keys that have a special meaning in SETUP Mode. The following paragraphs describe the function of each key when used in the SETUP mode. For detailed information, refer to Part 2 of this chapter.

NOTE

The numeric keypad normally generates the same codes as the unshifted numeric keys on the main keyboard.

SET TAB



This key sets a horizontal tab stop at the current active column.

CLEAR TAB



This key clears a horizontal tab stop at the current active column.

CLEAR ALL



This key clears all horizontal tab stops.

LEFT MAR



This key sets the left margin at the current active column.

RT MAR



This key sets the right margin at the current active column.

MAR CLEAR



This key clears both the right and left margins.

STATUS



This key prints out the status message that contains the currently selected values of the SETUP and internal communication features.

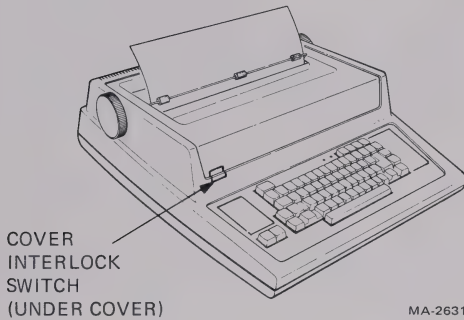
NOTE

The internal communication features are printed in the status message only when they have been selected.

TERMINAL CONTROLS

Cover Interlock Switch

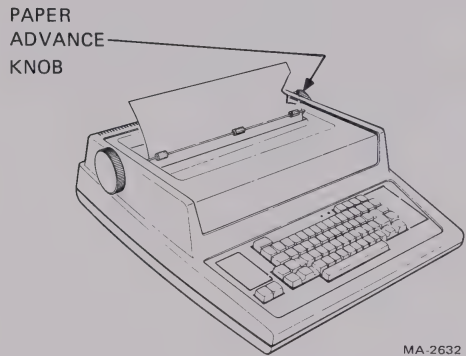
The cover interlock switch is a safety feature that inhibits the operation of the LA34 while the access cover is open.



MA-2631

Paper Advance Knob

The paper advance knob, when turned, advances the paper one step at a time. Pressing in and turning the paper advance knob enables the paper to be rolled freely in either direction for precise vertical forms positioning.



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Paper Release Lever

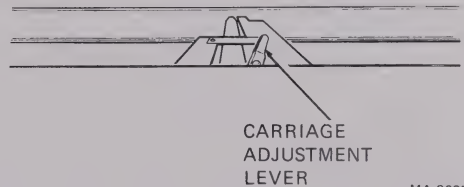
The paper release lever allows the operator to reposition or remove the paper or preprinted form from the terminal.



MA-2629

Print Head Adjustment Lever

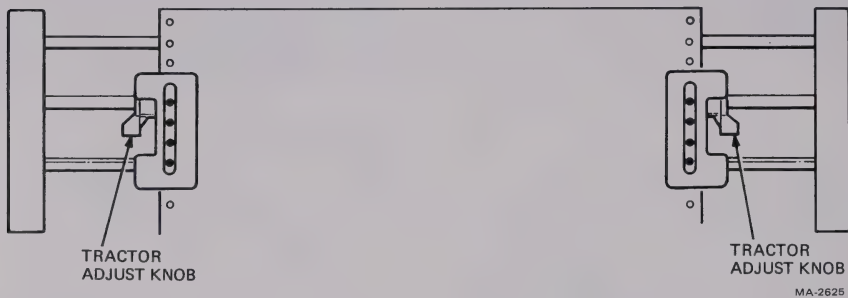
The print head adjustment lever controls the print head gap for single or multipart forms.



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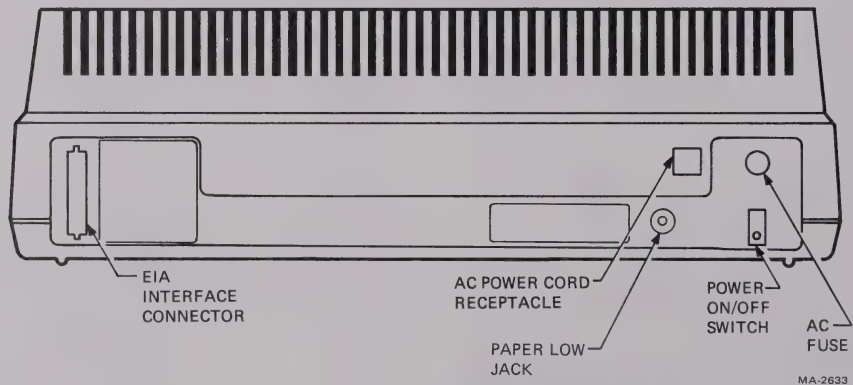
Tractor Adjust Knobs (Optional)

The tractor adjust knobs allow fine horizontal adjustment of forms.



Power ON/OFF Switch

The power switch controls the application of power to the LA34.



TERMINAL INDICATORS

Figure 1-4 shows the location of the LA34 terminal indicators. The following paragraphs describe each indicator in detail.

SETUP

This light flashes to indicate that the LA34 is in SETUP mode.

POWER/FAULT

When this light comes on it indicates that the LA34 has been turned on. It flashes to indicate that one of the following conditions has occurred.

- Paper Fault
- Access Cover Open
- Print Head Jam

To reset any of the above conditions, refer to the operator's troubleshooting table in Part 4 of this chapter.

Column Indicator

An indicator is provided to show the current column being addressed by the print head.

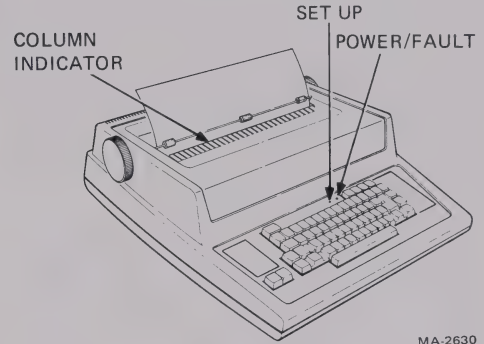


Figure 1-4 LA34 Terminal Indicators

AUDIBLE INDICATORS

Bell Conditions

The LA34 produces a bell tone when any of the following conditions occur.

Cause	Action/Comments
Approaching Right Margin	A bell tone occurs when the print head reaches the eighth column from the right margin and there was typing activity on that line.
Input Buffer Overflow	If the LA34 cannot process data faster than new data is received from the input buffer, an input buffer overflow can occur. During an overflow condition, the bell tone sounds with each character received and the character is lost.
Output Buffer Overflow	Typing faster than the LA34 can transmit can cause an output buffer overflow. During an output buffer overflow condition, a bell tone sounds each time a character key is typed and the character is lost.
Bell Code	Each bell code received by the LA34 will cause the bell tone to sound.
Head Jam	A head jam is indicated by a flashing POWER/FAULT lamp and multiple bell tones. To reset the fault condition, refer to the operator's troubleshooting guide in Part 4 of this chapter.
Illegal Character Typed During SETUP	Typing an illegal character while in SETUP will cause the bell tone to sound each time the illegal character is typed.

INTERNAL COMMUNICATION SWITCHES

To send and receive data, the LA34 must be compatible with the equipment and the program at the other end of the line. Therefore, the communication features that are normally pre-selected should not be changed unless compatibility with the computer system is verified. Figure 1-5 shows the location and arrangement of the internal communication switches. The following paragraphs describe the internal communication features in detail and the procedure used to change each feature.

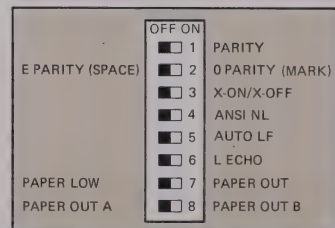


Figure 1-5 Internal Communication Switches

FEATURE DESCRIPTION

Parity (Switch 1)

The parity feature enables single bit errors to be monitored, and thereby ensures that the data is correct. If an error in transmission occurs, the LA34 can detect it and indicate its presence by printing the error character () in place of the character that was received in error. Error detection occurs only when the parity feature is enabled.

Parity Sense (Switch 2)

If the parity feature is enabled, the parity sense feature determines if the parity bit is to be even or odd. If the parity feature is disabled, the parity sense switch determines if the parity bit is to be forced to a mark or space condition.

Auto XON/XOFF (Switch 3)

The LA34 is capable of automatically generating and responding to the XON (DC1) and XOFF (DC3) codes. The XOFF code is used to stop the transmission of data from the host computer to the terminal, while the XON code is used to resume the transmission. (For more detail refer to the Synchronization section of Chapter 3.)

ANSI New Line (Switch 4)

The ANSI new line feature determines if an automatic carriage return is performed in addition to the line feed upon the receipt of a line feed (LF) character. When the ANSI new line feature is enabled and the LA34 receives a line feed code, an automatic carriage return is performed in addition to the line feed. If the ANSI new line feature is disabled, only the line feed is executed.

Auto Line Feed (Switch 5)

The auto line feed feature allows the RETURN key on the LA34 to function like the RETURN key on a standard electric typewriter. When the auto line feed feature is enabled, pressing the RETURN key generates the carriage return (CR) and

the line feed (LF) codes. If the auto line feed feature is disabled, pressing the RETURN key generates only the carriage return (CR) code.

NOTE

If double line feeds occur, the auto line feed should be turned off as the host computer software is automatically echoing line feeds.

Local Echo (Switch 6)

When the local echo feature is enabled, codes that are sent from the keyboard are internally looped to the printer portion of the terminal in addition to being sent to the host computer.

NOTE

If double characters occur, the local echo feature should be turned off as the host computer software is automatically echoing data to the terminal.

Paper Fault/Paper Out (Switches 7 and 8)

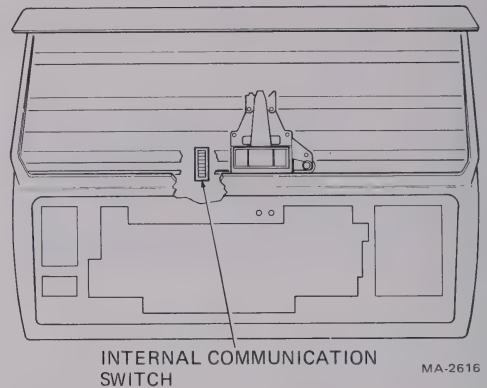
The LA34 can detect a paper fault (paper out or paper low) condition only if one of the two paper fault detection options is installed. When a paper fault is detected, the POWER/FAULT light flashes and the LA34 responds by generating a preselected signal. The operator can choose the signal response that the LA34 will take when a paper fault occurs. Table 1-1 describes the different signal responses available, the associated switch settings, and the action that the LA34 will take in each situation.

Feature Selection

In all cases, the reset procedure remains the same. To clear the paper fault, reload the paper and then clear the fault by pressing the VIEW key. The LA34 will then resume normal operation.

Use the following procedure to select or change an internal communication feature.

1. Open the access cover and move the print head to the right side plate.
2. Using a ball point pen, reach in between the timing belt and front carriage shaft and make the desired switch selection. (See Figure 1-6.)
3. Close the access cover and reset the fault by pressing the VIEW key.
4. Print out the status message to ensure that the proper feature has been selected. (Refer to Part 2 of this chapter.)



NOTE

The internal communication feature status is printed in the status message only when that feature has been selected.

Figure 1-6 Internal Communication Switch Location

Table 1-1

Switch Settings		LA34 Response to Paper Fault	
	OFF ON		
Paper Low	 7	Data terminal ready is dropped when carrier detect is deasserted. If the carrier detect signal is not deasserted, the LA34 will continue to print and data may be lost.	
Auto X-ON/X-OFF	 3	Transmits an XOFF	
Paper Out,	 7		
Paper Out,	 7	Data Terminal Ready is dropped.	
Paper Out A	 8		
Paper Out,	 7	Transmits a .233 (short) break.	
Paper Out B	 8		

Part 2 SETUP MODE

• SETUP MODE

The LA34 SETUP features are a series of standard features that allow the operator to tailor the terminal to meet the requirements of the individual computer installation. These features are examined or changed in a special mode of operation called SETUP mode.

NOTE

SETUP procedures should be performed in local mode. However, if the host computer can ensure against data loss SETUP procedures can be performed on line.

Use the following procedure to enter and exit SETUP

Once SETUP is exited, the selected features are temporarily stored in the terminal memory and may be used in terminal operation. If power to the terminal is lost, the temporarily stored SETUP feature settings are lost. When power is restored these features are reset to their initial settings. Refer to the terminal reset section of this chapter for more detail.

PROCEDURE	INDICATION/COMMENTS
Press and hold CTRL and press SETUP to enter SETUP mode. SETUP features may now be selected or changed.	The SETUP lamp flashes indicating that the LA34 is in SETUP mode.
Press SETUP to exit SETUP mode.	The SETUP lamp will stop flashing.

SETUP FEATURES

The SETUP features can be divided into four main categories: form set up, status, terminal reset, and self-test. Table 1-2 summarizes the SETUP features and the procedure used to change them, while the following paragraphs describe each SETUP feature in detail.

NOTES

1. Do not use the **SHIFT** key unless specified.
2. The LA34 must be in SETUP mode to change SETUP features.

Table 1-2 Setup Feature Summary

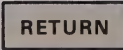
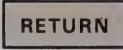
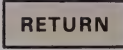
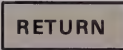
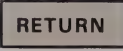
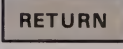
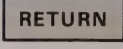
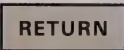
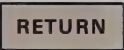
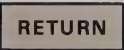
SETUP Feature	Keys Used To Change Feature	Function
Tabs		Sets a horizontal tab stop at the current column
		Clears the horizontal tab stop at the current column
		Clears all horizontal tab stops
Margins		Sets the left margin at the current column
		Sets the right margin at the current column
		Clears both the left and right margins
Horizontal Pitch	   	Selects 10 characters/inch
	   	Selects 12 characters/inch
	   	Selects 13.2 characters/inch
	   	Selects 16.5 characters/inch
Vertical Pitch	   	Selects 2 lines/inch
	   	Selects 3 lines/inch
	   	Selects 4 lines/inch
	   	Selects 6 lines/inch
	   	Selects 8 lines/inch
	   	Selects 12 lines/inch

Table 1-2 SETUP Feature Summary (Cont.)

SETUP Feature	Keys Used To Change Feature	Function
Status		Prints the current terminal status.
	 	Prints out the horizontal pitch (characters per inch) status information
	 	Prints out the vertical pitch (lines per inch) status information
Terminal Reset	 	Resets the temporarily stored SETUP features to initial settings and causes the terminal to exit SETUP mode
Self-test	 	Prints out a ripple pattern
	  	Prints out a pattern of multiple vertical bars in four passes per line
	 and ANY PRINTABLE CHARACTER	Prints out the selected character continually
	 	Spaces across the platen, line feeds, and then repeats

NOTE

The self-test ends when any character is typed on the keyboard.

Form SETUP

The form SETUP features allow the operator to set margins, tabs, and select the desired horizontal and vertical pitch. If desired, the operator can select the existing form that is permanently stored in the LA34. To examine this form refer to the terminal reset section of this chapter.

NOTE

Form settings can be automatically loaded into the LA34 by the host computer software. (See Chapter 3.)

Recommended Sequence

The following recommended sequence should be used as a guide for setting up a form. You do not

have to use all the features listed, however, the order of presentation is important. The list is followed by detailed information about each feature.

PROCEDURE:

1. Enter SETUP mode.
2. Select the desired number of characters per inch.
3. Select the number of lines per inch you require.
4. Set the left horizontal margin.
5. Set horizontal tab stops.
6. Set the right horizontal margin.
7. Exit SETUP mode.

• **CHARACTERS PER INCH** (HORIZONTAL PITCH)

The LA34 offers four different characters per inch selection.

Characters Per Inch	Example	Characters Per Inch	Characters Per Line
10 CPI	10 CHARACTERS/INCH	10 CPI	132
12 CPI	12 CHARACTERS/INCH	12 CPI	158
13.2 CPI	13.2 CHARACTERS/INCH	13.2 CPI	174
16.5 CPI	16.5 CHARACTERS/INCH	16.5 CPI	216

This feature, besides saving paper, can be used to print a full 132 columns on paper that can conveniently be bound in a loose-leaf notebook and stored in a standard-width file cabinet.

NOTE

When changing the horizontal spacing, note that the margins are reset to their maximum settings.

PROCEDURE		INDICATION/COMMENTS
Enter SETUP mode		SETUP lamp flashes
		To select:
Press	H = A and RETURN	10 CPI
Press	H = B and RETURN	12 CPI
Press	H = C and RETURN	13.2 CPI
Press	H = D and RETURN	16.5 CPI
Exit SETUP mode		SETUP lamp will stop flashing

NOTE

If preprinted forms are used, check to ensure that the characters are printed within the columns.

SETTING LEFT HORIZONTAL MARGIN**PROCEDURE**

Enter SETUP mode

To select the left margin position the print head

Press

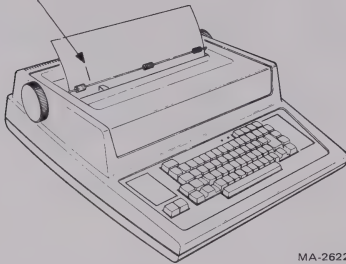
**INDICATION/COMMENTS**

SETUP lamp flashes

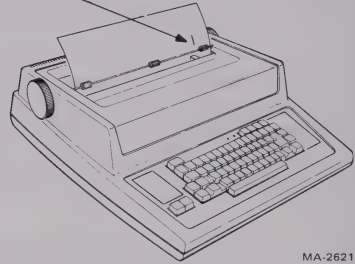
Left margin is set

NOTE

If desired, the tab setting procedure may be performed prior to setting the right margin.

LEFT MARGIN

MA-2622

RIGHT MARGIN

MA-2621

SETTING RIGHT HORIZONTAL MARGIN**PROCEDURE**

To select the right margin, position the print head

Press



Exit SETUP mode

INDICATION/COMMENTS

Right margin is set

SETUP lamp will stop flashing

CLEARING HORIZONTAL MARGINS**PROCEDURE**

Enter SETUP mode

Press



Exit SETUP mode

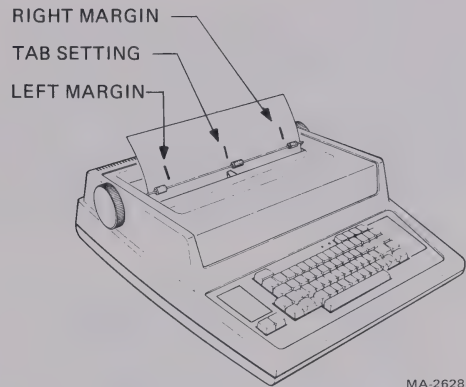
INDICATION/COMMENTS

SETUP lamp flashes

Both horizontal margins are cleared

SETUP lamp will stop flashing

SETTING HORIZONTAL TABS



MA-2628

PROCEDURE

Enter SETUP mode

Position the printhead in the desired column.

Press



Repeat the above two steps for each additional tab.

Exit SETUP mode

INDICATION/COMMENTS

SETUP lamp flashes

Tab is set

SETUP lamp will stop flashing

CLEARING HORIZONTAL TABS

PROCEDURE

Enter SETUP mode

Clearing a Single Horizontal Tab

Press TAB to move print head to the tab setting to be cleared.

Press



Clearing all Horizontal Tabs

Press



(CLR ALL)

Exit SETUP mode

INDICATION/COMMENTS

SETUP lamp flashes

Head will advance to the next horizontal tab stop

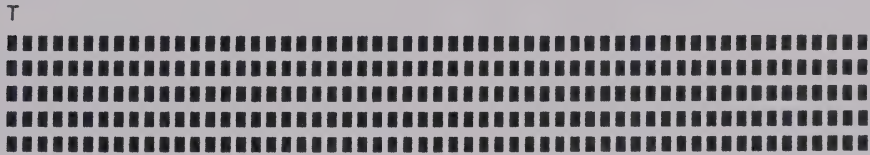
The horizontal tab is cleared

All horizontal tabs are cleared

SETUP lamp will stop flashing

VERTICAL BAR SELF-TEST

Example:



PROCEDURE	COMMENTS/INDICATION
Enter SETUP mode	SETUP lamp flashes
Press T and SHIFT \	LA34 will print out a pattern of multiple vertical bars
Press any character key	Self-test is terminated
Exit SETUP mode	SETUP lamp will stop flashing

NON-PRINTING SELF-TEST

PROCEDURE	COMMENTS/INDICATION
Enter SETUP mode	SETUP lamp flashes
Press T and press SPACE BAR	The LA34 spaces across the platen, returns and then repeats.
Press any character key	Self-test is terminated
Exit SETUP mode	SETUP lamp will stop flashing

• STATUS

What is the status of the terminal? A special feature of the LA34 is a printout of the current SETUP and internal communication feature status.

NOTE

The internal communication features will be displayed only when they have been selected.

Below is a simulated printout of the status message.

H (cpi):A=10, B=12, C=13.2, D=16.5 H=A

V (lpi):A=6, B=8, C=12, D=2, E=3, F=4, V=A

X-ON/X-OFF

O Parity

L T T T T T T R

V1.0

To obtain a status message, perform the following procedure.

NOTE

The numeric keypad normally generates the same codes as the unshifted numeric keys on the main keyboard.

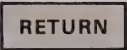
PROCEDURE	COMMENTS/INDICATION
Enter SETUP mode	SETUP lamp flashes
Press 	Status message will be printed out
Exit SETUP mode	SETUP lamp will stop flashing

• TERMINAL RESET

The LA34 contains a read-only memory that is set with typical SETUP information. This memory is non-destructable; it cannot be changed or erased. This is useful if you have no special setting requirements, or if you desire a specific starting point for your set up. Whenever power to the terminal is lost, the temporarily stored SETUP feature settings are lost. When power is restored, the LA34 resets the features to the following values.

FEATURE	SETTING
Horizontal Tab Stops	1, 9, 17, 25, 33, 41, 49, 57, 65, 73, 81, 89, 97, 105, 113, 121, 129
Left Margin	1
Right Margin	132
Horizontal Pitch	10 cpi
Vertical Pitch	6 lpi

Use the following procedure to perform a terminal reset.

PROCEDURE	COMMENTS/INDICATIONS
Enter SETUP mode	SETUP lamp flashes
Press  and press 	The LA34 resets the temporary SETUP features to their initial settings and causes the terminal to exit SETUP. The SETUP lamp will stop flashing.

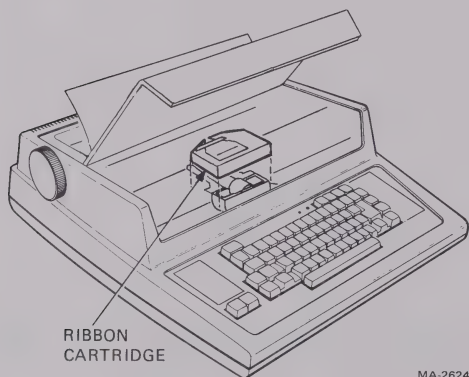
Part 3 RIBBON CARTRIDGE, FORMS AND IMPRESSION ADJUSTMENT

INSTALLING A RIBBON CARTRIDGE

The ribbon cartridge used in the LA34 will provide approximately 16 hours of continuous printing. When the print contrast becomes too light the ribbon cartridge should be replaced.

CAUTION

Only DIGITAL-recommended ribbon cartridges (Part No. 3615514) should be used in the LA34. Use of other ribbon cartridges can damage the print head and may void the warranty.



MA-2624

Figure 1-7 Ribbon Cartridge Installation

Refer to Figure 1-7 and perform the following steps to install a ribbon cartridge.

1. Open the access cover.
2. Remove and discard the old ribbon cartridge.
3. Using the ribbon adjust knob, take any slack out of the ribbon.
4. Line up the snap buttons on the new ribbon cartridge with the corresponding holes in the carriage assembly (Figure 1-7).
5. Press the new ribbon cartridge onto the carriage assembly while turning the ribbon adjust knob.
6. Close the access cover.
7. Reset the fault by pressing the VIEW key.

LOADING PAPER AND PREPRINTED FORMS

General

The LA34 will accept friction-feed or sprocket-feed paper/forms ranging in width from 7.62 to 47.58 cm (3 to 14-7/8 inches). A summary of the paper specifications is given at the end of Chapter 2. The following rules apply to paper used in the LA34.

Friction-Feed Paper/Forms

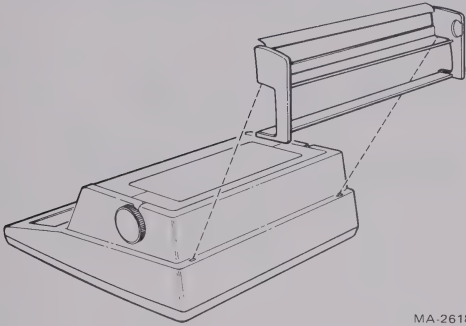
- Cut sheet or roll paper may be used.
- Multipart forms are not recommended.
- Impact paper is not recommended.
- Card stock is not recommended.

Sprocket-Feed Paper/Forms

- Multipart forms may have only one card part; the card must be the last part.
- First-surface impact paper is not recommended.
- Dot or line glue margins are acceptable (one margin only).
- Split forms (different number of sheets on each side of the form) are not recommended.

Paper/Forms Loading (Friction-Feed)

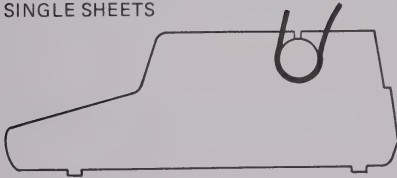
Friction-feed paper-forms can be loaded into the LA34 as you would normally load paper into a typewriter. To load paper or preprinted forms into the LA34 (Figures 1-8 and 1-9), perform the following steps.



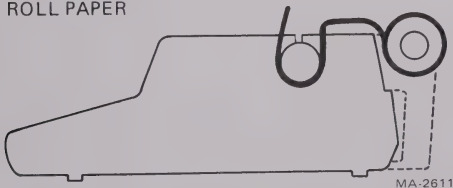
MA-2618

Figure 1-8 Paper Roll Holder Installation

FRICTION FEED SINGLE SHEETS



FRICTION FEED ROLL PAPER



MA-2611

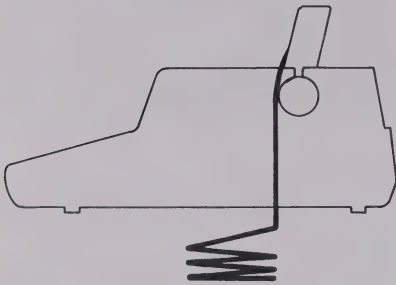
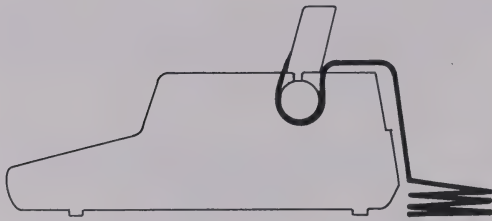
Figure 1-9 Friction-Feed Paper Loading

1. If you are using roll paper, mount the paper roll holder as shown in Figure 1-8.

2. Load and align the roll of paper on the roll paper holder as desired.
3. Feed the paper or preprinted form through the paper slot located behind the platen. Using the paper adjust knob, rotate the paper to its normal position.
4. Lift the bail bar and pull the paper release lever towards the front of the terminal. Smooth the paper over the surface of the platen and align the paper or preprinted form horizontally.
5. Push the paper release lever towards the rear of the terminal and return the bail bar to its normal position.
6. Perform the print impression adjustment that is described in the following section of this chapter.
7. Set up your form as described in the forms set up section of this chapter.

Paper/Forms Loading (Sprocket-Feed)

1. Install the tractor option LAX34-AL. (Refer to Chapter 4.)
2. Loosen the left and right tractor adjusting screws.
3. Position the left tractor feed pins approximately five cm (two inches) from the left side plate. This provides optimum margins for 132 column paper. It may be necessary to re-adjust when using preprinted forms.
4. Open both tractor covers.
5. Place the paper/forms on the table behind the LA34 with the leading edge of the paper parallel to the paper slot and the left edge of the paper in line with the left tractor (Figure 1-10).



MA-2612

Figure 1-10 Sprocket-Feed Paper Loading

NOTE

If the printer stand option LAX34-SL is being utilized, the paper may then be loaded from the bottom of the LA34 (Figure 1-10).

6. Feed the paper through the paper slot, pull the paper release toward the front of the

terminal, align the left margin holes over the feed pins, and close the left tractor cover.

7. Align the right margin holes over the feed pins, tighten the cover.

NOTE

If the paper pulls against the tractor pins or bows in the middle, readjust the right tractor.

8. Set up your form as described in the form set up section of this chapter.

PRINT IMPRESSION ADJUSTMENT

1. Open the access cover.
2. Move the printhead adjust lever all the way to the left.
3. Move the printhead adjust lever toward the right side plate one notch.
4. Close the access cover, press the view key, and type approximately ten characters.
5. Repeat steps 3 and 4 until proper print quality is obtained.

NOTE

If the form ripples or is pulled by the print head, move the print head adjust lever toward the left side plate one notch and repeat step 4.

Part 4 TESTING AND TROUBLESHOOTING THE LA34

The LA34 has a self-test feature that can help the operator determine if the problem is in the printer or some other portion of the communication system. For more detail refer to Part 2 of this chapter.

If you are unable to turn on the terminal or if the LA34 appears to be faulty, refer to Table 1-3. This table describes the checks an operator should make before requesting service.

Table 1-3 Operator Troubleshooting

Symptom Possible	Possible Cause and Corrective Action
LA34 will not turn on when the Power switch is set to ON	The AC power cord is not plugged into wall outlet or rear of terminal; plug in the cord. The power is not coming from the wall outlet; check the outlet with a known working device (such as a lamp). If there is no power, call your electrician. The AC line fuse is blown; turn the printer OFF and have the fuse replaced. Refer to the terminal controls section of this chapter for fuse locations.
Characters will not print, POWER/FAULT light flashes	The printer is out of paper; reload paper and reset fault by pressing the VIEW key. Refer to the paper/forms loading section of this chapter. The access cover is open or ajar; close the access cover and reset the fault by pressing the VIEW key.
No keyboard or printer response Light print	Incorrect communication set up. The ribbon is out of ink; replace the ribbon cartridge. Refer to Part 2 of this chapter. The print head is too far from the paper; perform a print impression adjustment. Refer to Part 3 of this chapter.

Table 1-3 (Cont.)

Symptom Possible	Possible Causes and Corrective Action
Ink smudges during print operation	The paper is not firmly wrapped around the platen; lift the bail bar and smooth the paper over the surface of the platen. Return the bail bar to its normal position. The print head is too close to paper; perform a print impression adjustment. Refer to Part 3 of this chapter.
Paper does not advance	The paper is not loaded properly; reload the paper. Refer to the paper/forms loading section of this chapter. The feed holes are torn; reload the paper. Refer to Part 3 of this chapter
Paper tearing on multipart forms	The print head is exerting too much pressure on the paper. Perform a print impression adjustment. Refer to Part 3 of this chapter. The paper is not straight in the printer; realign the paper.
Print head jam or print head does not move	The paper or print head jammed; open the access cover and clear the jam. Reset the fault by pressing the VIEW key.
Garbled or double characters	Incorrect communication set up.

CHAPTER 2

INSTALLATION, INTERFACE INFORMATION AND SPECIFICATIONS

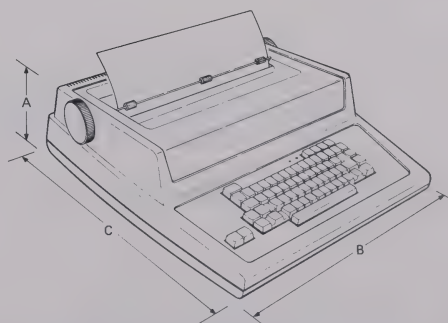
• INSTALLATION AND CONFIGURATION

GENERAL INSTALLATION INFORMATION

This section contains the step-by-step procedures used to unpack, cable, and check out the LA34. These procedures will ensure that the terminal was not damaged during shipment and that the LA34 is operating properly prior to connection to the communication system.

The LA34 should be installed in an area that is free from excessive dust, dirt, corrosive fumes, and vapors. To ensure that the unit has proper ventilation and cooling, the ventilation openings on the bottom of the terminal should not be obstructed. Extremes of temperature and humidity should be avoided. A summary of the guaranteed operating conditions of the LA34 can be found at the end of this chapter. Figure 2-1 shows the critical dimensions of the terminal.

2. Remove the documentation package, power cord, and any other cables which may be visible.
3. Lift the LA34 up and out of the carton and place it on the desired work surface.



UNPACKING AND INSTALLATION

The following procedure outlines the steps required to unpack and install the LA34.

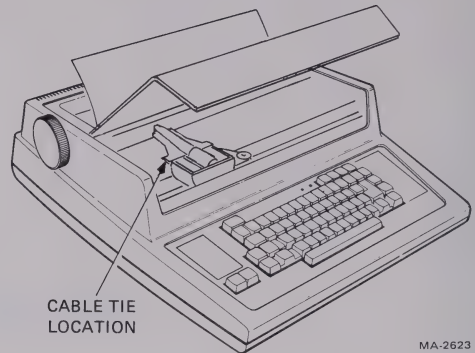
1. Cut the plastic strapping and open the top of the shipping carton.

DIMENSIONS	CENTIMETERS	INCHES
A. HEIGHT	18.3	7.2
B. WIDTH	55.9	22
C. DEPTH	41.7	16.4

MA 2619

Figure 2-1 LA34 Dimensions

4. Remove the shock absorbing material and packing from around the LA34.
5. Carefully inspect the LA34 housing and carriage assembly for possible shipping damage. Check the enclosed packing list for lost or missing items. Report any damaged or missing items to the local DIGITAL Field Service or Sales office, and to the local carrier.
6. Open the LA34 access cover to clip and remove the nylon cable tie securing the print head assembly (Figure 2-2).
7. If necessary wipe the outer surfaces with a clean, soft, lint-free cloth.
8. Before connecting the LA34 to a power source, ensure that the line voltage is compatible with the power requirements of the terminal. (Refer to the 115/230 voltage selector switch section of this chapter.)
9. Connect the interface cable from the user's equipment to the LA34.



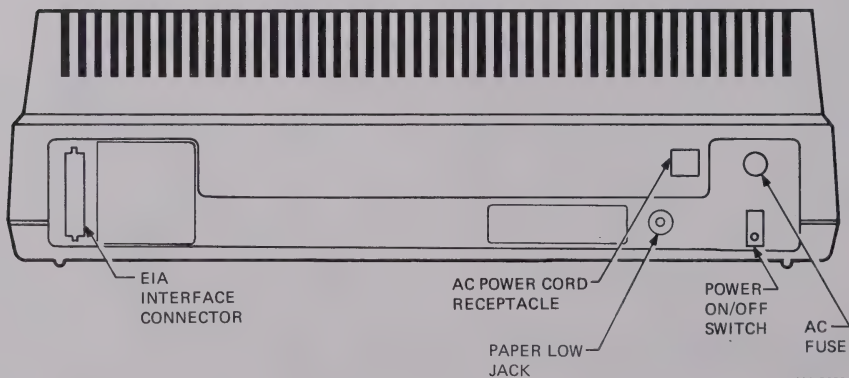
MA-2623

Figure 2-2 Cable Tie Location

NOTE

Site plans are not supplied by Digital Equipment Corporation. Interface logic connections must be specified and provided by the system supplier or the customer, because each installation may be different.

10. Connect the power cord to the receptacle on the rear of the terminal (Figure 2-3).
11. Perform the checkout procedure as outlined in this chapter.



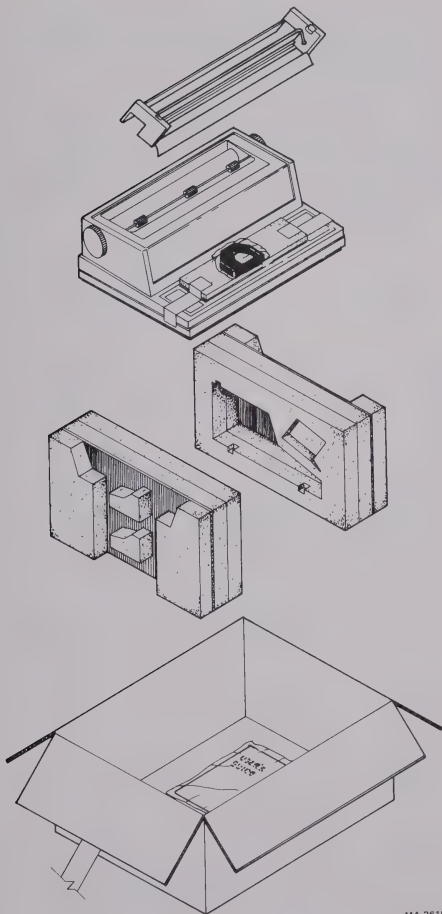
MA-2633

Figure 2-3 LA34, Rear View

PACKING PROCEDURES

If it becomes necessary to ship the LA34 to another location; repack it per the following procedure.

1. Remove the ribbon cartridge and paper.
2. Using a nylon cable tie, secure the print head assembly to prevent movement while in transit.
3. Pack the LA34 as shown in Figure 2-4.

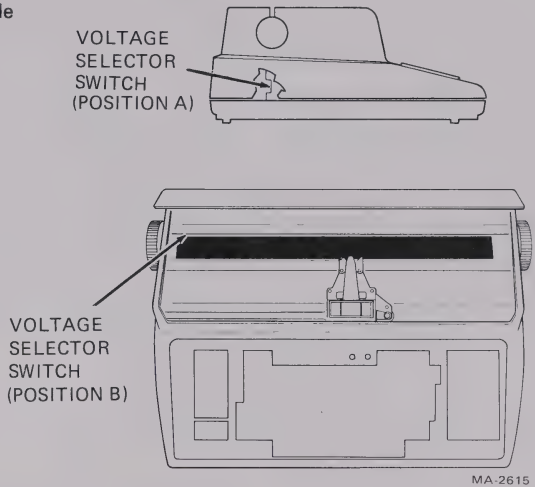


MA-2610

Figure 2-4 Unpacking/Packing Procedure

115/230 VOLTAGE SELECTOR SWITCH

Figure 2-5 shows the two possible locations, (A or B) of the 115/230 voltage selector switch. Use the following appropriate procedure (A or B) to verify or change the voltage range selected.



MA-2615

Figure 2-5 Voltage Selector Switch

Procedure A

Lift the access cover and use a ball point pen to select the desired voltage range.

Procedure B

1. Lift the access cover and press the two access cover retainer clips. Lift the cover straight up.
2. Lift the bail bar to gain access to the platen. Remove the platen by simultaneously pressing the two platen release levers and lifting the platen straight up.
3. Using a small blade screwdriver, release the four pop fasteners that secure the printer housing to the vase assembly (Figure 2-6).

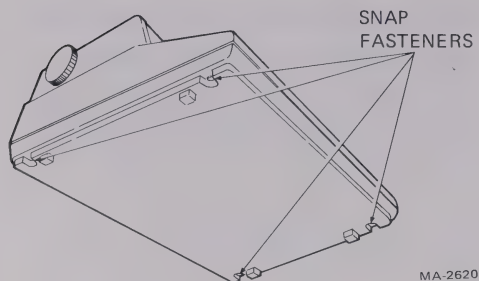


Figure 2-6 Snap Fasteners

4. Remove the printer housing by lifting straight up.
5. The voltage selector switch is now accessible and may be changed using a right angle blade screwdriver.
6. Reinstall the printer housing by pressing the housing onto the base assembly.
7. Press the platen release levers and snap the platen back into place. Return the bail bar to its normal position.
8. Reinstall the access cover by pressing the access cover retainer clips and pressing the cover into place.

CHECKOUT PROCEDURES

1. Install a ribbon cartridge per the ribbon cartridge installation procedure. (Refer to Part 3 of the operator's chapter.)
2. Install the paper per the paper/forms loading procedure. (Refer to Part 3 of the operator's chapter.)
3. Connect the LA34 line cord to the correct wall receptacle. Set the POWER switch to ON; the print head automatically positions itself to the left margin and the terminal performs a line feed (Figure 2-3).
4. Perform the self-test procedure. (Refer to Part 2 of the operator's chapter.)

INTERFACE INFORMATION

EIA Interface

The basic LA34 operates on full duplex, asynchronous communication lines. The terminal interfaces to EIA devices with a 25-pin connector mounted on the back of the terminal that meets the requirements of EIA specification RS-232-C. A summary of the EIA connector signals is listed below, while the following paragraphs explain each signal in detail, as they are used in the LA34.

EIA Connector Signals

Pin Number	Description	Pin Number	Description
1	Protective Ground	7	Signal Ground (Common Return)
2	Transmitted Data (TXD)	8	Carrier Detect (CD)
3	Received Data (RXD)	9	(Not Used)
4	Request to Send (RTS)	10	(Not Used)
5	Clear to Send (CTS)	11	Secondary Request to Send (SRS)
6	Data Set Ready (DSR)	12	Secondary Carrier Detect (SCD) or Speed Indicator (SPDI)
		13	(Not Used)
		14	(Not Used)
		15	(Not Used)
		16	(Not Used)
		17	(Not Used)
		18	(Not Used)
		19	Secondary Request to Send (SRS)
		20	Data Terminal Ready (DTR)
		21	(Not Used)
		22	Ring Indicator (RI)
		23	Speed Select (SPDS)
		24	(Not Used)
		25	(Not Used)

EIA Connector Signals

Protective Ground – Pin 1

The protective ground is electrically connected to external grounds through the third wire of the power cord

Transmitted Data (TXD) – Pin 2

Direction: From LA34

These signals represent serially encoded characters that are generated by the LA34

Received Data (RXD) – Pin 3

Direction: To LA34

These signals represent serially encoded characters that are generated by the user's equipment

Request to Send (RTS) – Pin 4

Direction: From LA34

Deasserted at all times when the terminal is powered up

Clear to Send (CTS) – Pin 5

Direction: To LA34

Ignored at all times

Data Set Ready (DSR) – Pin 6

Direction: To LA34

Ignored at all times

Signal Ground – Pin 7

The signal ground establishes a common ground reference potential for all interface circuits except protective ground. The signal ground and protective ground are physically connected

Carrier Detect (CD) – Pin 8

Direction: To LA34

Monitored for paper low detection only (Refer to Part 1 of the operator's chapter for more detail.)

Secondary Request to Send (SRS) – Pins 11, 19

Direction: From LA34

Ignored at all times

Secondary Carrier Detect (SCD) – Pin 12

Direction: To LA34

Ignored at all times

Data Terminal Ready (DTR) – Pin 20

Direction: From LA34

Data terminal ready asserted indicates that the LA34 is capable of transmitting and receiving data. The LA34 de-asserts Data Terminal Ready when any of the following conditions occur:

- The terminal is powered off.
- The terminal is placed in local.
- A paper fault occurs (Refer to the internal communication switch section of Chapter 1).

At all other times data terminal ready is asserted.

Ring Indicator (RI) – Pin 22

Direction: To LA34

Ignored at all times

Speed Select (SPDS) – Pin 23

Direction: From LA34

Ignored at all times

• LA34 SPECIFICATIONS

Spacing	
Horizontal	10 characters/inch with a maximum of 132 characters/line; 12 characters/inch with a maximum of 158 characters/line; 13.2 characters/inch with a maximum of 168 characters/line, or 16.5 characters/inch with a maximum of 216 characters/line User selected
Vertical	2, 3, 4, 6, 8, or 12 lines/inch User selected
Characters	96 upper/lower case ASCII 7×9 dot matrix
Printing	10 or 30 characters/second Switch selected
Paper	Roll feed
Width	7.62 to 37.78 cm (3 to 14-7/8 in)
Weight	
Single-part	6.8 kg (15 lb) paper minimum
Roll diameter	4-1/2 inch maximum
Core diameter	1 inch
NOTES 1. Multipart forms are not recommended. 2. Impact paper is not recommended. 3. Card stock is not recommended.	
Sprocket Feed	
Width	7.62 to 37.78 cm (3 to 14-7/8 in)
Weight	
Single-part	6.8 kg (15 lb) paper minimum 0.25 mm (0.010 in) thick card stock maximum
Multipart	1 to 4 parts (see notes) 0.50 mm (0.020 in) thick maximum
NOTES 1. Multipart forms may have only one card part; the card must be the last part. 2. First surface impact paper is not recommended. 3. Dot or line glue margins are acceptable (if line is on one margin only). 4. Split forms (forms with eachside containing a different number of sheets) are not recommended.	

Ribbon Cartridge	
Dimensions	
Length	10.64 cm (4.188 in)
Width	14.15 cm (5.570 in)
Height	1.42 cm $\pm$.051 cm (.560 in $\pm$.02 in)
Ribbon Fabric	
Material	Nylon, non-textured
Thickness	.086 mm – .1076 mm (.0034 in – .0042 in)
Width	1.27 cm $\pm$.0381 cm (.50 in $\pm$.015 in)
Ribbon Life	16 hours of continuous printing
Power	
Voltage	90–128 VAC 180–256 VAC (Switch selectable)
W maximum	Printing 45 W
W maximum	Non-printing 25 W
Temperature	
Operating	10° to 40° C (50° to 104° F) Noncondensing
Nonoperating	–40° to 66° C (–40° to 151° F) Noncondensing
Relative Humidity	
Operating	10 to 90 percent with a maximum wet bulb temperature of 28° C (82° F) and a minimum dew point of 2° C (36° F) Noncondensing
Nonoperating	5 to 95 percent
Dimensions	
Length	55.9 cm (22 in)
Width	16.4 cm (6.4 in)
Height	18.3 cm (6.5 in)
Terminal Weight	10 kg (22 lbs)

CHAPTER 3

PROGRAMMING INFORMATION

GENERAL

The LA34 combines the performance of a printer with the convenience of a terminal. It has full horizontal forms capability and adheres to ANSI standards. In addition, it supports several private escape sequences.

Using the escape sequences described in this chapter, the programmer can control the following LA34 features.

- Product Identification
- Horizontal Pitch
- Horizontal Margins
- Horizontal Tabs
- Vertical Tabs
- Terminal Reset

PRINTABLE CHARACTERS

If the active column is not greater than the right margin, each printable character is printed at the printing rate and the active column is incremented. Exceeding the right margin generates a carriage return, line feed, and print function. This causes the character which exceeded the right margin to be printed on a new line.

Table 3-1 lists the 7-bit printable characters that the LA34 receives and prints.

NUMERIC KEYPAD (OPTIONAL)

This keypad allows numbers to be entered in calculator or adding machine fashion. Each number key, the minus key, period key, and comma key normally generate the same codes as the corresponding unshifted keys on the main keyboard. The SHIFT key does not affect the numeric keypad.

PF1, PF2, PF3, PF4

These keys on the numeric keypad generate the following multiple codes.

Key Octal Code

PF1	033 117 120
PF2	033 177 121
PF2	033 117 122
PF3	033 117 123

BREAK KEY

A break signal is defined as the occurrence of a continuous space for greater than one character time. The LA34 transmits a .233 ms (+10 percent) space for a break signal when the BREAK key is pressed.

An untimed break of at least 3.5 seconds is generated by holding down the SHIFT key and pressing the BREAK key.

Table 3-1 LA34 Printable Characters

CODE	CHAR	CODE	CHAR	CODE	CHAR
040	space	100	@	140	\
041	!	101	A	141	a
042	"	102	B	142	b
043	#	103	C	143	c
044	\$	104	D	144	d
045	%	105	E	145	e
046	&	106	F	146	f
047	'	107	G	147	g
050	(	110	H	150	h
051	)	111	I	151	i
052	*	112	J	152	j
053	+	113	K	153	k
054	,	114	L	154	l
055	-	115	M	155	m
056	.	116	N	156	n
057	/	117	O	157	o
060	0	120	P	160	p
061	1	121	Q	161	q
062	2	122	R	162	r
063	3	123	S	163	s
064	4	124	T	164	t
065	5	125	U	165	u
066	6	126	V	166	v
067	7	127	W	167	w
070	8	130	X	170	x
071	9	131	Y	171	y
072	:	132	Z	172	z
073	;	133	[	173	{
074	<	134	\	174	
075	=	135	]	175	}
076	>	136	^	176	~
077	?	137	-		

CTRL (Control) KEY

The CTRL key is used in conjunction with other keys on the keyboard to generate control codes. If the control key is held down and any key listed in Table 3-2 is pressed, the actual code transmitted is in the range 000–037(8).

Table 3-2 Control Codes Generated

Key pressed with CTRL key down (shifted or unshifted)	Octal Code Transmitted	Function Mnemonic
Space Bar	000	NUL
A	001	SOH
B	002	STX
C	003	ETX
D	004	EOT
E	005	ENQ
F	006	ACK
G	007	BEL
H	010	BS
I	011	HT
J	012	LF
K	013	VT
L	014	FF
M	015	CR
N	016	SO
O	017	SI
P	020	DLE
Q	021	DC1
R	022	DC2
S	023	DC3
T	024	DC4
U	025	NAK
V	026	SYN
W	027	ETB
X	030	CAN
Y	031	EM
Z	032	SUB
[	033	ESC
\	034	FS
]	035	GS
~	036	RS
?	037	US

CONTROL CHARACTERS

Table 3-3 lists the 7-bit control characters that the LA34 receives and responds to.

Table 3-3 Control Characters

Octal Code	Character	Mnemonic
000	Null	(NUL)
007	Bell	(BEL)
010	Backspace	(BS)
011	Horizontal Tab	(HT)
012	Line Feed	(LF)
013	Vertical Tab	(VT)*
014	Form Feed	(FF)*
015	Carriage Return	(CR)
021	XON	(DC1)
023	XOFF	(DC3)
030	Cancel	(CAN)
032	Substitute	(SUB)
033	Escape	(ESC)
177	Delete	(DEL)

*This character is converted to a line feed (012) by the basic LA34.

Control characters not listed above are ignored when received by the LA34.

Null/Delete (NUL or DEL)

The null and delete characters are used for timing by the host and are stripped out of the data stream upon reception. The delete code may also be used to abort an escape sequence.

Bell (BEL)

The bell character sounds an audible tone when received by the LA34.

Backspace (BS)

If the active column is greater than the left margin, the backspace character decrements the active column and is processed at the normal print rate. If the active column is at the left margin, the backspace character is ignored.

Horizontal Tab (HT)

When a tab is set to the right of the active column, the receipt of a tab character causes a slew to that tab stop to be executed. When no tabs exist to the right of the active column, the active column will proceed to the next line.

Line Feed (LF)

The line feed character causes the LA34 to increment the active line. If ANSI NEW LINE is selected, then the active column is also set to the left margin.

Carriage Return (CR)

The carriage return character returns the active column to the left margin and is processed at the normal slew rate.

XON/XOFF (DC1, DC3)

The LA34 is capable of generating and responding to XON(DC1) and XOFF(DC3) codes. The XOFF code is used to stop the transmission of data from the host computer to the terminal, while the XON code is used to resume the transmission.

Cancel (CAN)

The cancel character normally terminates any pending escape sequences and causes the sequence to be ignored.

Substitute (SUB)

The substitute character is interpreted as being in place of a character received in error. The substitute character also has the effect of a cancel character.

Escape (ESC)

The escape character is interpreted as an introducer of an escape sequence. Escape sequences are described in detail in another section of this chapter.

ESCAPE SEQUENCE COMMANDS

The LA34 utilizes escape sequences standardized by ANSI to control many of its features. For those LA34 features which lack an ANSI standard escape sequence, additional escape sequences have been defined within the realm of extensions permitted by the ANSI system.

ANSI, the American National Standard Institute, has established a flexible and comprehensive system for transmitting format and editing information. It can be used with printing terminals like the LA34 as well as video terminals and printers. It has the following major advantages.

1. It is well defined and well documented. This greatly decreases the chances of incompatible implementations and aids in achieving device independence in output.
2. It has ample provisions for future extensions without sacrificing compatibility with older programs. The syntax used in ANSI controls allows a large number of new controls to be added with little difficulty.
3. It is compatible with all frequently used communication protocols. In contrast, many other systems use control codes that are reserved for communication functions. In these other systems, codes used for line turnaround, disconnect and synchronization get confused with those used to send parameter values.

The LA34 interprets escape sequences sent to it. None of the characters in an escape sequence are printed. When the end of the sequence is found (or an error occurs), the LA34 reverts to its normal printing mode. Control characters (that is characters with octal codes 000 through 037) may be embedded anywhere in an escape sequence. The control character performs its normal function and has no effect on the escape sequence. If an escape sequence is received by the

LA34 that it does not support, it is ignored. Escape sequences may also be entered and processed while in local mode, and may be used in lieu of setup commands.

In the list of escape sequences that follow, the escape character, octal code 033 is designated as ESC. Numeric parameters are shown explicitly or are designated as n or Pn. The graphic characters in escape sequences are shown using the United States ASCII character set. The characters are spaced apart for clarity only. The space

character, octal code 040, never appears in any escape sequence.

The format of a numeric parameter is a sequence of ASCII decimal digits, (octal codes 060 through 071). The parameter is interpreted as an unsigned decimal integer, with the most significant digit transmitted first. Leading zeros are allowed but not necessary. A missing parameter is interpreted as a place holder; that is, unless a numeric parameter is specified, the previous value of that parameter will be assumed. Plus and minus signs are not allowed.

Product Identification

The LA34 terminal automatically transmits an answer to the ANSI standard request for device attributes escape sequence.

The following escape sequences are used to cause the LA34 to transmit its product identification escape sequence.

ESCAPE SEQUENCE	FUNCTION
ESC Z	The LA34 transmits ESC [? 3 ; 0 c which forms the product identification of the basic LA34.
ESC [c	Same
ESC [0 c	Same

Horizontal Pitch

Horizontal pitch determines the width of printed characters as well as their spacing. The LA34 has four different horizontal pitch selections. Any combinations of pitch may be used on a single print line. Changing the horizontal pitch modifies the active column. The resulting new active column is that of the first column boundary at or to the right of the physical position of the previous active column in the old pitch. It is calculated as follows.

$$\text{Newcol} = 1 + \frac{(\text{Oldcol} - 1) \text{ Oldpitch}}{\text{Newpitch}}$$

where Newcol = the new active column
 Newpitch = The new pitch in characters/inch
 Oldcol = the old active column
 Oldpitch = the old pitch in characters/inch

The division performed above is an integer division. Any remainder or fractional part of the quotient is discarded.

The following escape sequences are used to set horizontal pitch.

ESCAPE SEQUENCE	FUNCTION
ESC [0 w	Set horizontal pitch to 10 characters/inch
ESC [1 w	Set horizontal pitch to 10 characters/inch
ESC [2 w	Set horizontal pitch to 12 characters/inch
ESC [3 w	Set horizontal pitch to 13.2 characters/inch
ESC [4 w	Set horizontal pitch to 16.5 characters/inch

Horizontal Margins

Printing is permitted only within the inclusive left and right margins. A carriage return character moves the active column to the left margin. Attempting to move the active column to the left of the left margin sets the active column equal to the left margin.

Note that the max column is a function of horizontal pitch.

Horizontal Pitch	Max Column
10	132
12	158
13.2	174
16.5	216

The following escape sequence is used to set the left and right margins.

ESCAPE SEQUENCE	FUNCTION
ESC Pn ; Pn s	Set left and right margins to the values given

Horizontal Tabs

The LA34 has 216 possible horizontal tab stops, one for each column. Tab stops are associated with column numbers, not physical positions on the paper. Thus, changing horizontal pitch will also change the physical position of tab stops. Each stop may be set or cleared independently. Setting a stop already set has no effect; the same

is true for clearing a stop already cleared. Tab stops may be set or cleared without regard to margins or horizontal pitch.

The following escape sequences are used to set or clear horizontal tab stops.

ESCAPE SEQUENCE	FUNCTION
ESC H	Set horizontal tab stop at active column
ESC 1	Set horizontal tab stop at active column
ESC 0 g	Clear horizontal tab stop at active column
ESC 2 g	Clear all horizontal tab stops
ESC 3 g	Clear all horizontal tab stops
ESC 2	Clear all horizontal tab stops
ESC Pn ; . . . Pn u	Set horizontal tab stops at the values given

Vertical Pitch

Vertical pitch determines the spacing between lines, not the height of printed characters. Changing vertical pitch does not affect active line number.

The following escape sequences are used to set vertical pitch.

ESCAPE SEQUENCE	FUNCTION
ESC [0 x	Set vertical pitch to 6 lines/inch
ESC [1 x	Set vertical pitch to 6 lines/inch
ESC [2 x	Set vertical pitch to 8 lines/inch
ESC [3 x	Set vertical pitch to 12 lines/inch
ESC [4 x	Set vertical pitch to 2 lines/inch
ESC [5 x	Set vertical pitch to 3 lines/inch
ESC [6 x	Set vertical pitch to 4 lines/inch

Active Column and Active Line

The active column is defined as the column where the next character will normally be printed. The active line is defined as the line where the next character will normally be printed. Column and line numbers begin with one, not zero. Printable characters normally increment the active column. Linefeeds normally increment the active line. The active column and active line are collectively known as active position.

Active position is only loosely linked to the physical position of the LA34 printhead and paper mechanism. In general, the active column is only recorded when a character is actually printed.

Any previous history of active column values is not significant. The active line is different because it may only be advanced. Backward paper motion is not allowed. When the LA34 is idle, the active and physical positions are identical.

In the LA34, bell characters have only an active line attribute. They are not guaranteed to be sounded at any particular column within a line.

In addition to the normal position control characters (space, backspace, carriage return, and linefeed) the following escape sequences can be used to modify the active column and active line.

ESCAPE SEQUENCE	FUNCTION
ESC D	Increment active line (active column unchanged)
ESC E	Set active column to left margin and increment active line

Terminal Reset

The LA34 contains a read-only memory which contains standard SETUP information. This memory is non-destructable; it cannot be changed or erased. This is useful if there are no special setting requirements, or if a specific starting point

for SETUP is desired. When the terminal receives the reset escape sequence, or when power to the unit is removed and restored, the LA34 will reset all volatile setup parameters to the following values.

PARAMETER	SETTING
Horizontal tab stops	1, 9, 17, 25, 33, 41, 49, 57, 65, 73, 81, 89, 97, 105, 113, 121, 129
Left margin	1
Right margin	132
Horizontal pitch	10 cpi
Vertical pitch	6 lpi

The following escape sequence is used to reset the LA34.

ESCAPE SEQUENCE	FUNCTION
ESC c	Volatile SETUP parameters are reset to their initial values.

SYNCHRONIZATION

When the LA34 receives a character (other than the fill characters, NUL and DEL), it stores it in its 130 character input buffer. When the printer is ready, characters are fetched from the input buffer and printed. If the printer falls behind by more than 130 characters, the input buffer overflows and data is lost. There are two ways to avoid buffer overflows

1. Send data only as fast as it can be printed. When receiving data at 300 baud or less the LA34 can keep up with normal character sequences. Fill characters may be used to maintain throughput when horizontal tabs are used. Fill time formulas are given below.
2. Use a terminal synchronization protocol, such as XON/XOFF. Using a synchronization protocol, the LA34 can tell the data source when to pause in sending data and when to resume. Synchronization allows maximum throughput and eliminates the need for fill character calculations and message size limits.

When synchronization is used, the LA34 constantly monitors the number of characters stored in its input buffer. When the number of characters exceeds a "high water mark" (100 characters), the LA34 signals the data source to temporarily pause. Meanwhile the printer continues to take characters out of the input buffer. When the number of characters remaining is less than a "low water mark" (10 characters), the LA34 signals that transmission to resume.

The LA34 also sends a pause signal when the printer is not ready due to error conditions or operator actions. Running out of paper or detecting a printhead jam can cause a pause request to be sent. The operator can induce a pause request by opening the cover or entering set-up mode.

The pause and resume signals to the data source are sent using the control characters XON (octal code 021) and XOFF (octal code 023). XON/XOFF is suitable for either local or remote operation, as long as the connection is full duplex. To select XON/XOFF operation refer to the internal communications feature section in Chapter 1. The XON/XOFF protocol is complicated by the fact that the synchronization characters may be interspersed between the characters typed at the LA34 keyboard. The operator can tell the data source to pause by typing XOFF (control S) and to resume by typing XON (control Q). To make sure that neither the buffer controller's nor the operator's pause requests are lost, typed characters may be transmitted with an XOFF character immediately following.

FILL TIME FORMULAS

Horizontal Movement

This movement includes horizontal tabs and horizontal positioning escape sequences. First convert to the actual number of columns moved, then allow:

15 milliseconds for each of the first ten columns.

5.5 milliseconds for each additional column.

Vertical Movement

This movement includes linefeeds, vertical tabs, formfeeds, and vertical positioning escape sequences. First convert to the actual number of lines moved, then allow:

38 milliseconds for the first line moved up to .4233 cm (1/6 in).

200 milliseconds for each additional inch.

CHAPTER 4

OPTIONS

The LA34 has available options which are designed to enhance the basic terminal and make it useful in an even wider range of applications. The following paragraphs describe the options currently available and the procedure used to install each option.

ROLL PAPER HOLDER – LAX34-RL

The paper roll holder option allows the DECwriter IV to accept roll paper up to 37.78 (14-7/8 in) in width.

Roll Paper Holder Installation

To install the paper roll holder, line up the notches on the holder with the corresponding holes in the back of the terminal (Figure 4-1).

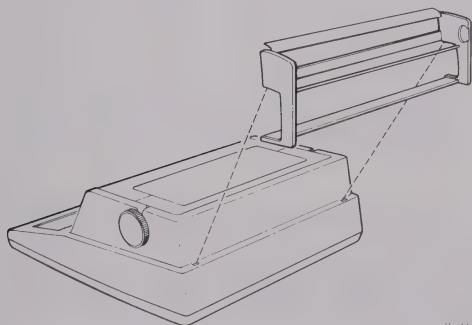


Figure 4-1 Paper Roll Holder Installation

NUMERIC KEYPAD – LAX34-KL

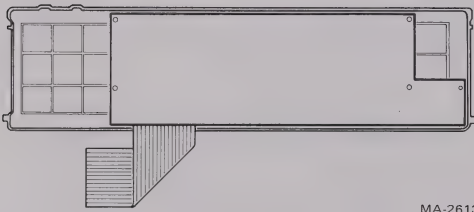
The 18 key numeric keypad allows the operator to enter numbers in calculator or adding machine fashion.

Numeric Keypad Installation

Use the following procedure to install the numeric keypad option.

1. Remove power from the terminal and disconnect the AC plug.
2. Remove the paper holder or tractors option (if installed), and remove the paper.
3. Remove the access cover by pressing the two access cover retainer clips.
4. Remove the ribbon cartridge.
5. Lift the bail bar to gain access to the platen. Remove the platen by simultaneously pressing the two platen release levers. Lift the platen straight out.
6. With a small blade screwdriver, release the four pop fasteners that secure the printer housing to the base assembly.
7. Remove the printer housing by lifting straight up.
8. Press the keyboard retainer clips and rotate the keyboard toward the front of the terminal.
9. Remove the keyboard connector from J6 on the logic board.
10. Lift the keyboard straight out.

11. Turn the keyboard upside down on a piece of foam or bubble plastic and remove the five kep nuts that secure the keyboard to the bezel.
12. Remove the keypad cover plate by pressing the retaining clips at both ends.
13. To install the numeric keypad, carefully snap the new assembly into place (Figure 4-2).
14. Connect the connector on the numeric keypad to J1 on the main keyboard.
15. Reinstall the keyboard by performing steps 1-10 in reverse order.



MA-2613

Figure 4-2 Numeric Keypad Installation

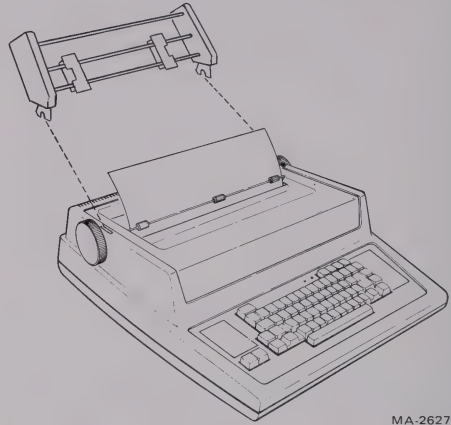
TRACTOR OPTION – LAX34-AL

The tractor option is provided to allow the DECwriter IV to accept sprocket-feed paper up to 37.78 cm (14-7/8 in).

Tractor Option Installation

Use the following procedure to install the tractor option.

1. Remove the access cover by pressing the retainer clips at both ends of the assembly.
2. Pop out the tractor plugs from the access cover.
3. Reinstall the access cover.
4. Press the tractor release buttons and snap the tractor option into place on the platen (Figure 4-3). To remove, perform steps 1-4 in reverse order.



MA-2627

Figure 4-3 Tractor Option Installation

PRINTER STAND OPTION – LAX34-SL

The printer stand provides a useful and attractive work surface for your DECwriter IV. In addition, it allows paper to be fed from the bottom of the terminal.

ACCESSORIES AND SUPPLIES

All DIGITAL printer terminals offer improved quality printing and forms-handling versatility. DIGITAL offers a variety of accessories and supplies to enhance terminal operation.

DIGITAL has the paper to accommodate up to 132-column print capability and multipart paper adjustments.

DIGITAL-specified nylon ribbon is designed to produce excellent print quality and lengthen print head operating life. DIGITAL's ribbon cartridge is designed to provide approximately 16 hours of continuous printing.

Purchase orders for accessories and supplies should be forwarded to:

Digital Equipment Corporation
Accessory and Supplies Group
125 Northeastern Boulevard
Nashua, New Hampshire 03060

OTHER TERMINALS

The terminal is the link between the user and the power of the computer. Often the right terminal, or the right enhancement to the terminal can make your work easier, more efficient, or more cost effective. For that reason, DIGITAL offers a full range of video and teleprinter terminals and options that can help you tackle any application.

180 CHARACTER PER SECOND

KEYBOARD PRINTER

The LA120, DIGITAL's fastest hardcopy terminal, offers better throughput than that of terminals with faster print speeds. The 180 character per second printhead prints bidirectionally and always seeks the next print position. The LA120 offers an unexcelled range of standard features. Over 45 keyboard-selectable features are offered. These features include variable font sizes, tabs, form length and many other features previously available only as options. To guide the operator through the myriad of possible configurations, the carefully human-engineered terminal uses mnemonic commands, a prompting LED display, a special decal and a convenient pocket-sized operator card.

VIDEO TERMINAL

For the ultimate in video terminals, look to DIGITAL's VT100. It combines exceptional versatility with simplicity of operation. And it's designed to allow a wide range of fast and easy field upgrades to meet your changing needs. There is a detached typewriter-style keyboard with a flexible, 3-wire coiled cord. An 18 key numeric/function keypad on the keyboard permits single keystroke control of application-specific functions. The VT100 fits easily on a standard

typewriter table. There is an advanced video option that provides 132-column lines of the screen for easy viewing of wide-line printer reports. Double height/double width characters are selectable line by line for easier reading and text formatting. Smooth scrolling a scan at a time lets your operators read new lines at a reasonable speed. Divided-screen displays; blinking, underlining, double intensity and normal or reverse video character attributes; keyboard and/or computer-settable tab stops; built-in, self-test diagnostics; pictorial capability; and many, many more.

INTELLIGENT VIDEO

TERMINAL

At the head of the VT100 class are DIGITAL's intelligent PDT-11 terminals. The PDT family includes three programmable data terminals: the PDT-11/110, the PDT-11/130, and the PDT-11/150. With their PDP-11 compatible processors and RT-11 operating system, the PDTs permit you to draw on a wide range of existing software. Local mass storage is available on the PDT-11/130 in the form of 511K bytes of storage provided in dual mini-cartridges. Housed within the same VT100 shell, these mini-cartridges are file-structured system devices. The PDT-11/150 lets you combine the functionality of the PDT-11 with the dual floppy disk storage of any DIGITAL terminal. With its 4 ports, the PDT-11/150 allows considerable system expansion. Add a terminal controller if you want the flexibility of up to four terminals. For hardcopy, add a printer to the printer port. There is a third port for an EIA link to a host computer. There's a products, just fill out the postage paid card at the back of this book and drop it in a mailbox.

Your comments and suggestions will help us in our continuous effort to improve the quality and usefulness of our publications.

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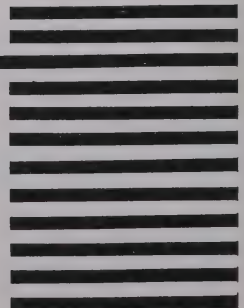
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The Operator and Programmer Reference Card is included in this manual for the user's convenience. It is a compilation of important operating and programming information and is designed to fit in a shirt pocket. To remove this card simply cut along the dotted lines and fold the card in the middle.

**PROGRAMMING INFORMATION
(CONT)**

ACTIVE COLUMN AND ACTIVE LINE

ESCAPE SEQUENCE	FUNCTION/COMMENTS
ESC D	Increment active line (active column unchanged)
ESC E	Set active column to left margin and increment active line

TERMINAL RESET

ESCAPE SEQUENCE	FUNCTION
ESC c	Volatile setup parameters are reset to their initial values.

digital

**DECwriter IV
OPERATOR AND
PROGRAMMER
REFERENCE CARD**

OPERATOR INFORMATION

SETUP MODE

KEY	FUNCTION/COMMENTS
CTRL and SETUP	Pressed to enter SETUP; SETUP light flashes
SETUP	Pressed to exit SETUP; SETUP light stops flashing.

NOTES

- 1. Do not use **SHIFT** unless specified.
- 2. The LA34 must be in SETUP to select the following features.

FORMS

KEY	FUNCTION/COMMENTS
TABS	
1	Set horizontal tab stop at current active column
2	Clear horizontal tab stop at current active column
3	Clear all horizontal tab stops
MARGINS	
5	Set left margin at current active column
6	Set right margin at current active column
7	Clear both horizontal margins
HORIZONTAL PITCH	
H = A RETURN	Select 10 characters per inch
H = B RETURN	Select 12 characters per inch
H = C RETURN	Select 13.2 characters per inch
H = D RETURN	Select 16.5 characters per inch

NOTE
Changing the horizontal pitch causes the horizontal margins to be reset to the maximum settings.

OPERATOR INFORMATION (CONT)

FORMS (CONT)

KEY FUNCTION/COMMENTS

VERTICAL PITCH

V = D RETURN	Select 2 lines per inch
V = E RETURN	Select 3 lines per inch
V = F RETURN	Select 4 lines per inch
V = A RETURN	Select 6 lines per inch
V = B RETURN	Select 8 lines per inch
V = C RETURN	Select 12 lines per inch

STATUS

KEY FUNCTION/COMMENTS

S	Print out current feature status information
H RETURN	Print out the horizontal pitch (characters per inch) status information
V RETURN	Print out the vertical pitch (lines per inch) status information

TERMINAL RESET

KEY FUNCTION/COMMENTS

I RETURN	Reset temporarily stored SETUP features to permanent settings
------------------------	---

SELF TEST

KEY FUNCTION/COMMENTS

T RETURN	Print a ripple pattern
T SHIFT V	Print a pattern of multiple vertical bars in four passes per line
T SPACERBAR	Spaces across the platen, returns, line feeds and then repeats
T AND ANY PRINTABLE CHARACTER KEY	Print the selected character continually

NOTE

Self-test ends when any character is typed on the keyboard or received from the host.

PROGRAMMING INFORMATION

PRODUCT IDENTIFICATION

ESCAPE SEQUENCE FUNCTION/COMMENTS

ESC Z	The LA34 transmits ESC [7 3 ; 0 C which forms the product identification of the basic LA34.
ESC c	Same
ESC 0 c	Same

HORIZONTAL PITCH

ESCAPE SEQUENCE FUNCTION/COMMENTS

ESC 0 w	Set horizontal pitch to 10 characters per inch
ESC 1 w	Set horizontal pitch to 10 characters per inch
ESC 2 w	Set horizontal pitch to 12 characters per inch
ESC 3 w	Set horizontal pitch to 13.2 characters per inch
ESC 4 w	Set horizontal pitch to 16.5 characters per inch

NOTE

Changing the horizontal pitch causes the horizontal margins to be reset to the maximum settings.

HORIZONTAL MARGINS

ESCAPE SEQUENCE FUNCTION/COMMENTS

ESC Pn ; Pn s	Set left and right margins to the values given
------------------------	--

HORIZONTAL TABS

ESCAPE SEQUENCE FUNCTION/COMMENTS

ESC H	Set horizontal tab stop at active column
ESC 1	Set horizontal tab stop at active column
ESC 0 g	Clear horizontal tab stop at active column
ESC 2 g	Clear all horizontal tab stops
ESC 3 g	Clear all horizontal tab stops
ESC 2	Clear all horizontal tab stops
ESC Pn : ... Pn u	Set horizontal tab stops at the values given

VERTICAL PITCH

ESCAPE SEQUENCE FUNCTION/COMMENTS

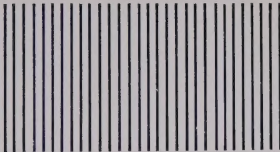
ESC 0 z	Set vertical pitch to 6 lines per inch
ESC 1 z	Set vertical pitch to 6 lines per inch
ESC 2 z	Set vertical pitch to 8 lines per inch
ESC 3 z	Set vertical pitch to 12 lines per inch
ESC 4 z	Set vertical pitch to 2 lines per inch
ESC 5 z	Set vertical pitch to 3 lines per inch
ESC 6 z	Set vertical pitch to 4 lines per inch

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DIGITAL SERVICES

A wide range of maintenance and customer services are available from DIGITAL for your terminal. Through use of these services, you can design a plan which meets your service needs, from complete DIGITAL maintenance to complete self-maintenance. Vendors supplying DIGITAL products may use these services as factory backup support.

ON-SITE SERVICE

DIGITAL offers responsive, low cost, factory level maintenance performed at your site by trained Terminals Service Specialists. This maintenance is provided through:

- Service agreements which cover all your maintenance needs including priority response, all labor, materials, and travel for a fixed monthly charge
- Per call service which is provided on a "time" and "materials" basis and can serve as a backup to your own in-house maintenance programs

OFF-SITE SERVICE

For those customers who have a significant level of troubleshooting expertise, but require Field Service assistance for the repair of components, DIGITAL has established a world-wide network of Product Repair Centers (PRC's) and the Customer Returns Area (CRA). Through a wide array of service product offerings this logistics network offers cost-effective services to include:

- Module MailerTM
- Fixed Price Exchange
- Product Refurbishment

SPARE PARTS

In an effort to further assist those customers who choose to perform their own computer maintenance, DIGITAL's Customer Spares organization is committed to providing thorough and timely spares support through:

- Spare Inventory Planning
- Component/Subassembly Spares
- Maintenance Test Equipment
- Maintenance Documentation Service
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TRAINING

DIGITAL offers hardware maintenance courses through the Educational Services group in anyone of our 17 world-wide training centers, or depending upon your specific training requirements, courses can be provided in your own facilities.

TERMINAL SUPPLIES

DIGITAL offers a variety of supplies to enhance terminal reliability and make operation easier. Everything from furniture accessories, (cabinets, tables, etc.) to terminal supplies such as paper, ribbons, diskettes, cassettes, labels, and many other items as illustrated in the Supplies Brochure. This brochure and all other items may be ordered by dialing a toll free number (800-258-1710). Orders will be processed within 24 hours (U.S. only with the exception of Hawaii and Alaska).

To obtain further information concerning any of the customer services available, fill out the attached card or write:

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